

REMARKS

This application has been reviewed in light of the Office Action dated June 18, 2003. In view of the foregoing amendments and the following remarks, favorable reconsideration and withdrawal of the rejection set forth in the Office Action are respectfully requested.

Claims 1-13 are pending. Claims 1-7 have been withdrawn, as directed to a non-elected invention. Claim 8 has been amended. Claims 9-13 have been added. Support for these claims and changes can be found in the original disclosure, and therefore no new matter has been added. Claims 1 and 8 are in independent form.

Applicants respectfully traverse the restriction requirement set forth in the Office Action. In the Office Action, it was alleged that the inventions of Groups I and II are distinct because they are related as subcombinations, with Group I having a separate utility. However, Applicants note that withdrawn Claim 1 recites many features identical or similar to those of Claim 8. Even though Claim 1 recites first and second applications of light and first and second masks, Claim 8 recites applying light through a mask.

Therefore, it is respectfully submitted that the amount of effort required by the U.S. Patent and Trademark Office would be lessened by permitting all of the claims presently in the application to be prosecuted in a single application. The alternative is to proceed with the filing of multiple applications, each consisting of the same disclosure, and each being subjected to substantially the same search, perhaps by different Examiners on different occasions, with the resultant burden on the Patent and Trademark Office. Moreover, it is respectfully submitted that the public at large should not be required to obtain and study separate patent documents in order

to have available all of the issued patent claims covering the invention. Accordingly, it is respectfully requested that the Examiner reconsider the requirement for restriction and allow Claims 1-6 and 8-13 to be prosecuted in a single application.

Claim 8 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,458,254 (*Miyagawa et al.* '254) in view of U.S. Patent No. 5,331,344 (*Miyagawa et al.* '344).

Independent Claim 8 is directed to a method of manufacturing an ink-jet recording head comprising the steps of preparing a base plate having an ink ejection pressure generating element and a liquid path pattern, which is removable, located on a part of the base plate that includes the ink ejection pressure generating element, applying a first active energy setting material on the base plate and the liquid path pattern, applying an ink-repellent second active energy setting material, which is dry, on the first active energy setting material before exposing the first active energy setting material, exposing the first active energy setting material and the ink-repellent second active energy setting material in a process by applying light to both of the materials simultaneously through a mask corresponding to an ejection port for ejecting ink, and developing the first active energy setting material and the ink-repellent second active energy setting material so as to form the ejection port above the ink ejection pressure generating element.

By virtue of the features recited in Claim 8, such as the features recited in the step for applying the second active energy setting material, which is dry, and in the exposing step, the ejection port can be formed with a high precision and with a uniform ink-repellent property all over the ejection port forming surface, with ease of manufacturing and at low cost.

Miyagawa et al. '254 relates to a method for manufacturing a liquid jet recording head. According to the method, an ink flow passage pattern 4 is formed on a substrate 1 by a dissolvable resin, a resin layer 5 is formed on pattern 4, a silicon oxide film 6 is formed on resin layer 5, and a resist is formed on film 6 (see, e.g., col. 9, line 50 - col. 12, line 4 and col. 15, lines 41ff). Further, a pattern exposure is applied to the film 6, which is then developed and rinsed. After this, the film 6 is etched by a plasma to form an ink discharging port pattern (see, e.g., col. 11, lines 51-56).

Miyagawa et al. '254 is not seen to suggest exposing and developing resin layer 5. Moreover, the ink discharging ports 7 of *Miyagawa et al.* '254 are formed only as a result of the plasma etching. The application of the pattern exposure and development does not suffice to form the ink discharge ports. Applicants submit that nothing in *Miyagawa et al.* '254 would teach or suggest a step of exposing a first active energy setting material and an ink-repellent second active energy setting material in a process by applying light to both of the materials simultaneously through a mask corresponding to an ejection port for ejecting ink, or of developing the first active energy setting material and the ink-repellent second active energy setting material so as to form the ejection port above an ink ejection pressure generating element.

The Office Action (page 4) cites col. 16, lines 41-46 of *Miyagawa et al.* '254 as teaching "developing the first active and the ink-repellent second active energy setting materials with an aqueous solution . . . to form the ejection port 7 above the ink ejection pressure generating elements 2" However, Applicants wish to point out that the cited portion of *Miyagawa et al.* '254 teaches that "as shown in Fig. 6, the positive photosensitive resin is eluted

to form the ink flow passages 8" (emphasis added); it does not teach forming ejection port(s).

Rather, the formation of the ink discharging ports 7, shown in Fig. 5, occurs prior to the formation of ink flow passages (see, e.g., col. 16, lines 34-40).

Miyagawa et al. '344 relates to a method for producing a liquid discharging recording head, a recording head produced thereby, and a recording apparatus utilizing the recording head. The method of *Miyagawa et al.* '344 includes a step of forming a first photosensitive material layer for ink channel formation, pattern exposing the first layer, forming a second photosensitive material layer on the first layer, pattern exposing the second layer for forming an ink discharge opening and ink supply opening, and developing both layers.

It should be noted that *Miyagawa et al.* '344's first photosensitive material layer does not correspond to Applicants' first active energy setting material or ink-repellent second active energy setting material, since *Miyagawa et al.* '344's first photosensitive material layer is for forming an ink channel, not an ejection port. According to Claim 8, both the first active energy setting material and the ink-repellent second active energy setting material are exposed and developed so as to form an ejection port. Applicants can find nothing in *Miyagawa et al.* '344 that would suggest an ink-repellent second active energy setting material such as is recited in Claim 8.

Applicants submit that nothing in *Miyagawa et al.* '344 would teach or suggest a step of exposing a first active energy setting material and an ink-repellent second active energy setting material in a process by applying light to both of the materials simultaneously through a mask corresponding to an ejection port for ejecting ink, or of developing the first active energy

setting material and the ink-repellent second active energy setting material so as to form the ejection port above an ink ejection pressure generating element.

The Office Action (page 4) cites *Miyagawa et al. '344* as teaching “forming an equivalent liquid path pattern (photosensitive resin layer 3 in Fig. 2) on a base plate 1 by applying light through a mask 4 (see Fig. 3) and [afterwards] developing the liquid path pattern 3 (see col. 12, lines 24-37).” However, Applicants note that the cited portion of *Miyagawa et al. '344* teaches formation of a liquid path pattern, not an ejection port. Accordingly, combining *Miyagawa et al. '344* with *Miyagawa et al. '254* would not achieve the exposing and developing steps recited in Claim 8, whereby an ejection port is formed. Rather, such a combination could only achieve formation of a liquid path pattern by application of light through a mask. In addition, even if *Miyagawa et al. '344*'s application of light through a mask were applied to the process of forming an ejection port in *Miyagawa et al. '254*, this would not suffice to allow *Miyagawa et al. '254* to form an ejection port by exposing and developing as recited in Claim 8, because *Miyagawa et al. '254* requires plasma etching to form an ejection port. Accordingly, *Miyagawa et al. '344*, whether taken singly-or-in-combination with *Miyagawa et al. '254*, is not seen to remedy the deficiencies of the latter reference with respect to Claim 8.

Since neither *Miyagawa et al. '254* nor *Miyagawa et al. '344*, whether taken alone or in combination (even assuming, for the sake of argument, that such combination were permissible), contains all of the elements of Claim 8, that claim is believed allowable over those references.


A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against independent Claim 8. That claim is therefore believed patentable over the art of record.

The other claims presented for examination in this application are each dependent from independent Claim 8 and are therefore believed patentable for at least the same reasons. Since each of these dependent claims is also deemed to define an additional aspect of the invention, however, the individual consideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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